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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,658	12/21/2001	Seemant Choudhary	064731.0251	2771

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EXAMINER	
LEUNG, CHRISTINA Y	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,658	CHOUDHARY ET AL.	
	Examiner	Art Unit	
	Christina Y. Leung	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-13* is/are allowed.

6)☒ Claim(s) *14-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12-21-01; 5-8-03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 14 and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hansen et al. (US 6,271,950 B1).

Regarding claim 14, Hansen et al. disclose an optical modulator (transmitter 101 in Figure 1) comprising:

a plurality of electrical precoding modules (i.e., delay elements in delay encoder 107), each of the preceding modules operable to receive a data stream and to precode the data stream (column 2, lines 58-65); and

a plurality of phase modulators coupled in series (phase modulator elements in M electrode phase modulator 106), each of the phase modulators operable to receive the precoded data stream from a corresponding one of the precoding modules, to receive an optical signal from a preceding one of the phase modulators in the series, and to modulate the received optical signal according to the precoded data stream from the corresponding precoding module (column 1, lines 37-46; column 2, lines 53-57).

Examiner notes that Hansen et al. disclose that the elements in delay encoder 107 are considered "pre-encoder" elements (column 2, lines 63-64).

Regarding claim 18, as similarly discussed above with regard to claim 14, Hansen et al. disclose a method for precoding optical data signals (Figure 1) comprising:

receiving a plurality of electrical data streams (D_0, D_1, ...D_{M-1}) all having communications at a first data rate (column 2, lines 58-59; column 6, lines 50-61);

electrically precoding each of the electrical data streams (using delay encoder 107 ; column 2, lines 58-65);

receiving an optical carrier signal (from CW laser 105);

phase modulating the optical carrier signal according to each of the electrically precoded data streams to generate an optical data signal encoding information from all of the electrical data streams (using M electrode phase modulator 106), the optical data signal having communications at a second data rate equal to the number of electrical data streams multiplied by the first data rate (column 3, lines 42-45).

Regarding claim 19, as similarly discussed above with regard to claims 14 and 18, Hansen et al. disclose an optical modulator (transmitter 101 in Figure 1) comprising:

means for receiving a plurality of electrical data streams all having communications at a first data rate (transmitter 101 includes inputs for receiving data streams D_0, D_1, ...D_{M-1});

means for electrically precoding each of the electrical data streams (i.e., delay encoder 107; column 2, lines 58-65);

means for receiving an optical carrier signal (transmitter 101 includes an input for receiving an optical carrier signal from CW laser 105);

means for phase modulating the optical carrier signal according to each of the electrically precoded data streams to generate an optical data signal encoding information from all of the

electrical data streams (i.e., M electrode phase modulator 106), the optical data signal having communications at a second data rate equal to the number of electrical data streams multiplied by the first data rate (column 3, lines 42-45).

Regarding claim 20, as similarly discussed above with regard to claims 14, 18, and 19, Hansen et al. disclose an optical modulator (Figure 1) comprising:

a first precoding module (for example, the delay element in the delay encoder 107 shown in Figure 1 having delay "τ") having an input and an output, wherein the input receives a first electrical data stream (for example, data stream D_1), and the output transmits a first precoded electrical data stream;

a second precoding module (for example, for example, the delay element in the delay encoder 107 shown in Figure 1 having delay "2τ") having an input and an output, wherein the input of the second precoding module receives a second electrical data stream (for example, data stream D_2), and the output of the second preceding module transmits a second precoded electrical data stream;

a first phase modulator (for example, the particular phase modulator coupled to delay element having delay "τ") having an optical input, an optical output, and a data input coupled to the output of the first precoding module, wherein the optical input receives an optical carrier signal, the first phase modulator modulates the optical carrier signal according to data received on the data input to generate a modulated optical signal, and the optical output transmits the modulated optical signal; and

a second phase modulator (for example, the particular phase modulator coupled to delay element having delay "2τ") having an optical input coupled to the optical output of the first

phase modulator, an optical output, and a data input coupled to the output of the second precoding module, wherein the second phase modulator modulates the modulated optical signal according to data received on the data input from the second precoding module to generate an optical data signal (column 1, lines 37-46; column 2, lines 53-65).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al. in view of Ono et al. (US 6,097,525 A).

Regarding claims 15 and 16, Hansen et al. disclose a system as discussed above with regard to claim 14 including precoding modules comprising delay elements, but they do not disclose precoding modules that perform an exclusive or operation or comprise a D flip-flop and an exclusive or gate as recited in the claims.

However, Ono et al. teach an optical communication system including a precoding module (for example, in Figure 16; column 9, lines 1-15). Regarding claim 15 in particular, they teach that the precoding module is further operable to precode the data stream by performing an exclusive or operation between the data stream and an output of the precoding module (using exclusive or circuit 26 in Figure 16).

Regarding claim 16 in particular, they teach that the precoding module comprises: a delay 27 having an input and an output; and an exclusive or gate 26 having a first input coupled to

receive the data stream, a second input coupled to the output of the delay 27, and an output coupled to the input of the delay 27, the output of the exclusive or gate further coupled to a corresponding modulator 30. Although Figure 16 shows a 1-bit delay circuit 27, it is well known in the art that D flip flops may be used to hold/delay bits and thereby implement the 1-bit delay circuit 27 taught by Ono et al. Ono et al. further explicitly teach that flip flops may be used in their precoding module (column 10, lines 61-63).

Regarding claims 15 and 16, it would have been obvious to a person of ordinary skill in the art to include precoding modules including exclusive or gates and flip flops as suggested by Ono et al. in the system disclosed by Hansen et al. in order to enable direct detection of the signals at the receiving end (as taught by Ono et al.; column 1, lines 55-62; column 4, lines 43-51; column 9, lines 7-9).

Regarding claim 17, Hansen et al. disclose delay modules 107 each disposed between the data stream inputs and a corresponding one of the phase modulators. Although Hansen et al. also call these delay elements "pre-encoders" as discussed above with regard to claim 14, they do not specifically disclose delay modules in combination with separate, other precoding modules. However, again, Ono et al. disclose including precoding modules in order to enable direct detection of signals, and the combination of Hansen et al. in view of Ono et al. as discussed above with regard to claims 15 and 16 would comprise a system having delay modules in combination with separate, other precoding modules. It would have been obvious to a person of ordinary skill in the art to include precoding modules of the type taught by Ono et al., in the system already including precoding modules in the form of delay modules as disclosed by Hansen et al., in order to enable direct detection of the signals at the receiving end.

Allowable Subject Matter

5. Claims 1-13 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter: The prior art, including Hansen et al. and Ono et al., does not specifically disclose or fairly suggest an optical modulator or a method for precoding optical data signals including the specific combination of all the elements, steps, and limitations recited in independent claims 1, 9, 12, and 13, particularly wherein a first phase modulator phase modulates an optical carrier signal according to a first data stream to generate a modulated optical signal; and a second phase modulator phase modulates the modulated optical signal (i.e., the output from the first phase modulator) according to a second data stream to generate an optical data signal, wherein the second data stream comprises a time-delayed version of the optical data signal (i.e., the output from the second phase modulator, in a feedback configuration).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 571-272-3023. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christina Y Leung
Christina Y Leung
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Art Unit 2633